PREPARATION OF COMPUTER ANIMATION MODEL FOR LEARNING ELECTRICAL MAGNETIC II PHYSICAL EDUCATION PROGRAM STUDENTS SEMESTER IV TEACHER TRAINING AND EDUCATION FACULTY SARJANAWIYATA TAMANSISWA UNIVERSITY 2014

Sunarto

Abstract

The experiment was conducted with the purpose : (1) to obtain the product models of learning computer animation physics electricity magnetism two physical education programs for students of fourth semester, and (2) to determine the effectiveness of learning outcomes using computer models animation the magnetic power of two courses in four semesters students Education Program Physics FKIP-UST Yogyakarta. This research is about the development of computer animation models in order to determine the effectiveness of teaching and learning magnets electric two physical education programs to students. The location of this research is in the Physical Education Program Guidance and Counseling-UST Yogyakarta. The subject of research is the development of developing the model and the effectiveness of learning computer animation magnetic power of two in a four-semester students in 2014 a number of 30 students. Data collection techniques in this study uses observation sheet instruments Likert scale models and objective multiple choice test. Data analysis techniques are quantitative and qualitative assessment to determine the product descriptive computer animation models to study the effectiveness of learning outcomes and the two magnet power on students. The results of this study are: (1) the product obtained by the learning model of computer animation with a score of two electric magnets valuation predicate 82.76 enter good ranking, and (2) a score of effectiveness of learning outcomes assessment in groups using a computer animation model is 84.33 ranked the predicate very effective. The conclusion is obtained by the product of computer animated models of learning with both predicate ranking, and student learning outcomes and the effectiveness of using a computer animation model makes a predicate ranked excellent or very effective.

Keywords: *Modeling, Animation, Computer, Learning, Electricity, Magnetism.*

Introduction

Determine the learning model is very successful in understanding the substance of the material students learning related symptoms and the fact that occur in natural phenomena, especially the electric field generated by an electric curren, the Lorentz force, Lenz's law and Faraday's law of motion electric force (emf) induced in a circular wire. Model of computer animation students can observe the process vesualisasi physics events. So the students are expected to be effective in remembering *(niteni)*, understanding *(ngerteni)*, repeat (neroke) to practice what has been seen or understood and add *(nambah)* the analysis so as to provide additional concepts or principles important in the laws of physics and its application in the circumstances day-to-day practical and theoretical. In the teachings of Dewantara Kihadjar no concept of education in learning, namely : (1) Tri N: *neteni, neroke dan nambahi*, (2) Tri *Nga: ngerti, ngrasa* dan *nglakoni*, dan Trilogi Kepemimpinan: *Ing Ngarsa sung tulada, Ing madya mangun karsa, Tut wuri hadayani.*

Learning about the magnetic power of two particular students in understanding the magnetic field induced by Oersted, the Lorentz force, Lenz's law and Faraday's law brought about by electrical experience kusulitan as abstract but real. In order for the occurrence of events of symptoms is not an abstract power magnet for students, then be required vesualisasi models with computer animation that can be observed. So it needs preparation in computer animation models to study with the title.

Problem Formulation. (1) How to create a model for teaching computer animation of two electric magnets? (2) How can the effectiveness of learning using computer animation model on two electric magnets?

Research Objectives. (1) Provided a model for teaching computer animation magnetic electric two vesualisasi the students about the process of how the magnetic field induced by Oersted, the Lorentz force, Lenz's law and Faraday's law; (2) Determine the effectiveness of student learning outcomes using the model of computer animation on the magnetic power of two on the substance

of the material according to Oersted magnetic field induction, Lorentz force, Lenz's law and Faraday's law.

Benefit Research. (1) Students : petrified physics education students in understanding the principles, concepts and laws of electricity with magnetism are two models of learning using computer animation, and add to the understanding can mimic in computer animation to create a model that is better for learning; and create on and berinovatif practice in selecting and making instructional media, so that effective learning outcomes. (2) Lecturer: (a) improve the ability to manage self-motivated learning lectures using commuter animation models for learning, and (b) develop a model in learning computer animation to improve the quality of competence profesinal. And (3) University: provide feedback in order to arrange repairs learning media with computer animation models in graduate higher education institutions , and can improve the effectiveness of learning.

Literature

Computer Animation Model. (1) The model describes the phenomenon of a technique and the process of giving an object or an activity (McLeod , Jr. , 1996; Afrizal Mayub 2005: 76). The model can be interpreted as a form, a prototype of an object or concept , with the object or purpose of the concept will be more easily analyzed , interpreted and understood. (2) Animation is (a) an animation techniques and provide standard process that looks at the movement of the object dies , and (b) is granting motion animation to inanimate objects (stationary) by making a series of drawings of inanimate objects (still) is in the interval the minimum (Soegeng , 1993; Afrizal Mayub , 2005: 76). (3) Animation is made by forming a series of frames that contains the graph in the timeline (Wijaya , D , 2002; Afrizal Mayub 2005: 76). So the animation model is defined as a way to "live " objects or abstract concepts or die so easily understood. Animation made from images that are passed through the scanner , an image of a hand or an application program to draw like Corel Draw , Free Hand , Adobe Illustrator or (Afrizal Mayub 2005: 76).

Basis of Computer Animation. Using Macromedia Flash MX facility is a professional standard that is used to create animations on the web (Zeembry , 2001; Afrizal Mayub , 2005: 29). Flash started as an animation software to create cells called Future Splash . Preparation of computer animation model in this study uses the learning in the animation tool called manually , it can be done in a way , the frame - by- freme animation and tweened animation . Frame - by- freme animation using a different image in each frame while tweened animation to ondengan Flash will work on the animation frame-by - frame between the start position and end position (between frames) . Enough to create a simple animation using layers , stage , scema , timeline , toolbox , tools , and others as well as refer Afrizal Mayub (2004 : 29-38) - other judgments .

Learning effectiveness . According to Indonesian General Dictionary effectiveness is defined : (1) has effect , influence , or result , and (2) provide satisfactory results. Effectiveness means the nature or the circumstances in order to effect or result (Badudu JS , 1974: 371) . Effectiveness is an effective derivation of the word in English effecttive defined simply " coming into use" (Oxford Learner 's Pocket Dictionary , 2003: 138) . Effectiveness in Eksiklopedi Administration is as follows : " a condition which implies the occurrence of the desired effect or result . If someone is doing something purposeful act , which is desired , then the person is said to be effective if it pleases consequences of it . " (The Liang Gie , 1989: 108) . According to Steers (1985 : 176) , that : " an organization that is truly effective is the one who is able to create a working atmosphere where workers not only carry out work that has been charged , but also makes the atmosphere so that the workers take more responsibility , act creative in order to improve efficiency in order to achieve the goal . " Criterion for Learning Effectiveness . According Hergenhahn & Matthew H Olson (208 : 2) learning is measured by the change in behavior . After making the learning process will be able to do something that they could not do before they make the process of learning . Learning will be effective if it involves physical activity and mental subjects students in the learning process . Activity will increase the

mastery of cognitive , affective and psychomotor , giving rise to a change in behavior of the subject students .

Matter Physics and Computer Animation Model . Is (1) Law magnitude induced Oersted field around current lisrtik mathematical formulation is shown with mathematical equations , namely : $\boldsymbol{B = \frac{\mu_0}{2\pi}\frac{I}{a}}$, (2) the Lorentz force around the magnitude of electrical current carrying straight wire shown with mathematical equations , namely : $\mathbf{F = \frac{\mu_0 I^2}{2\pi a}}$, Lentz 's Law and Faraday's Law in the form of a circular wire coil magnitude of the electromotive force (emf) is shown by mathematical induction , namely : $\varepsilon = -\varepsilon_{max}\,\mathbf{Sin\omega t}$, and (4) evaluation instrument form of objective test questionnaire item number forty . Preparation of computer animated models of learning refers to the steps Aburizal Yacub (2005 : 89-90) in developing models using computer animation to be done to provide modules that will be used , are : the main module , presentation materials , animated demos , and animations analysis . This module contains the necessary information and a button , including : title , button to select the next module by entering the inputs in the space provided so that no user interactivity with free , unlimited and botton to return

Computer -Based Media . Computer -based media text changable according to Azhar (2011 : 99-100) consists of : compoter not monitor page , but the delivery of dynamic moving slowly changing ; screen should not be too dense for some tanyangan into , or start with a simple and slowly , and add up to the desired complex stage ; choose the normal type , not ornate , using capital and lowercase letters , do not use all capital letters ; use between seven to ten words per line because it is easier to read short sentences rather than long sentences ; do not chop off the end of the line said , do not start a paragraph on the last line in the display screen, does not end the paragraph on the first line of the display screen, stretched sentence on the left, but on the right it's better not to be straight because it is easier to read ; distance of the two spaces is recommended for better readability ; choose a particular case characters for the title and key words , for example : bold , underline , italic ; given text box when the text was to be together

with a graph or other visual representation on the same display screen ; and consistent with the style and format selected .

Relevant Research . Supports models with computer animation , among others : Mayub A (1998) research on structured tasks and with computer simulations as an effort to improve learning outcomes in basic physics courses agronomy , research by Sri Waluyati (1997) , about the effectiveness of the package vedio to teach electronics skills , Suharyanto (1998) development research on computer-assisted teaching model physics . Based on the results of the above studies that learning to use a computer simulation , electronics with computer skills , and learning model development model can improve the effectiveness of learning . So thus this research has received support to conduct computer modeling animation can improve the effectiveness of learning outcomes electric magnet on physics education students .

Framework . The process of magnetic power is abstract but real , then compiled a computer animation model that can show vesualisai process , symptoms , events , and in fact can be observed by the student and the feasibility of this model should be tested . Students using computers anomasi vesualisai models is helping students to *neteni* , *neroke* , and *nambahi* . Students there learn the ease of an electric magnet using a computer animation model , then the results would be so more effective learning . So the logic of thinking is a product of learning models for computer animations that have been tested electrical magnets can feasibility produce effective and highly effective learning in students .

Research Methodology

Research Methods. This research uses an experimental approach or the development of computer animation models for learning two electric magnets on physics education students four semesters. Reference research in computer animation to create a model for learning the electric magnet on students physical education program , was according to Borg and Gall (1983: 784-785) there are ten (10) steps: (1) gathering information (research and information), (2) planning, (3) product planning, (4) pre-testing models, (5) revise the product (main product

revision), (6) to test the product on the field (playing fild testing), (7) stages product revision operations (operational field testing), (8) product revision phase field operations (operational field testing), (9) stages of revision of the final product (the final product revision), and (10) the deployment and execution stages (disimination and implementation). Based on the reference model development according to Borg and Gall mentioned above there are ten steps. Step this computer animation modeling done adaptation, namely: (1) develop learning worksheet students (LKPM), (2) develop LKPM be animated using computer models using Macromedia Flash MX, (3) obtained a model of learning computer animation Electricity Magnetism II , (4) to assess the feasibility of the model tests performed by the user (student of physics education four semesters) and the expert or experts progremer animated model of learning physics electricity magnetism, (5) use the product for a computer animated models of learning physics electricity magnetism, (6) assessment physics on student learning outcomes using the model of the computer animation, and (7) the product obtained by computer animation models for learning physics and the effectiveness of student learning outcomes.

Develop program and called program. Step-by-step animated model file called Oersted, Lorenz animated models, animated models Lentz and Faraday, and animated models of evaluation, are : (1) call the Oersted animation files that are in folders flv. on (press) {unload Movie ("materi_mc"); load Movie ("flv/ oursted.swf", "materi_mc"); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 260; materi_mc._y = 160; title_txt = "Animation Oursted"; video_mc._visible = false;}, (2) call the animation files that are on the menu Lorentz flv folder. on (press) {unload Movie ("materi_mc"); load Movie ("lorent.swf menu", "materi_mc"); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 280; materi_mc._y = 160; title_txt = "Lorentz force"; video_mc._visible = false;}, (3) calling the animation files Lentz and Faraday's law which are in flv folder. on (press) {appear; unoad Movie ("materi_mc"); loadMovie ("flv/lens1.swf law", materi_mc); materi_mc._xscale = 100; materi_mc._yscale = 100; materi_mc._x = 260; materi_mc._y = 160; title_txt =

"LENT Law and Legal FARADAY"; video_mc._visible = false;} Scripts to exit the application on (release) {fscommand ("quit" , " true");, And (4) evaluation Scripts to call on (press) {video_mc._visible = false; go to And Stop (1); title_txt = "Evaluation"; load Movie ("flv/info_evaluasi.swf", "materi_mc"); materi_mc._xscale = 110; materi_mc._yscale = 110; materi_mc._x = 300; materi_mc._y = 175;}.

Research Subjects and Location . The subject of the research is the implementation of two magnetic power of learning on all four semesters students Education Physics Program totaling 30 people . Location of research in Physics Education Program Teacher Training and Education Faculty of the University of Sarjanawiyata Tamansiswa Yogyakarta for four months or 16 weeks .

Preparation Instruments . Stages are : (1) develop indicators Instruments grating observation sheet Likert scale assessment , and objective tests , (2) develop instruments observation sheet in the form of a Likert scale assessment , and test ojektif a questionnaire , and (3) test the validity and reliability of objective tests refers to the results of the test indicated a significant difference before and after the study is done using a model of the learning process of computer animation learning physics .

Instrument Validity and Reliability . The validity of the instrument used to determine the construct validity (construct validity) . Proving the validity of this is done by arranging the instruments based on the lattice indicators , further testing and the results of the test instrument to the extent the item - item test includes the entire contents of region to be measured (Saiffudi Anwar , 1996: 175) . Content validity testing using rational analysis . One of the practical way is with see if the contents of the grain has been in accordance with the lattice indicators that have been written . The test result obtained results valitas coefficient exceeds 0.3 then said satisfy (Saiffudi Anwar , 1996: 179) . Instrument reliability test aims to determine the extent to which the results of a measurement can be trusted (Saiffudi Anwar , 1996: 180) . The trial results instrument reliability coefficient of at least 0.7 , then the test results the instrument

meets the requirements of reliability according to Kaplan and Sacczo, (Mawardi Lubis 2011 : 65) .

Data Collection . Using instruments : (1) the observation sheet with a Likert scale , product assessment models for computer animation and (2) objective test (questionnaire) for the assessment of student learning outcomes with multiple choice . Data respondents sources : (1) a model student users , experts and specialists or progremer animated model of learning physics , and (2) a physical education student of 30 people .

Data Analysis . Analysis of the data in this study was descriptive quantitative and qualitative assessment to determine the product yield and effectiveness of computer animated models of learning with the criteria according Sukardjo , et al (2006 : 75) , is : very good score of $k > 83.99$; Both scores k ($67.66 < k \leq 83.99$) ; Quite scores ($52.01 < k \leq 67.66$) ; Less scores ($36.01 < k \leq 52.01$) ; and very less score $\leq$ k 36.01 .Research Procedures . Are : (1) develop a model using computer animation and LKPM module , (2) to evaluate the feasibility of the model animation and LKPM modules on each title by respondent students , professors and experts of computer animation program , (3) make revisions or improvements at any LKPM animation models and modules based on the results of a feasibility evaluation and or suggestions by the respondents , (4) using models and computer animation LKPM modules for electrical magnets on student learning in groups , (5) data collection by performing tests on student learning before and after learning and score data obtained , (6) data processing students' test scores in quantitative and qualitative descriptive, (7) determine the assessment on the model of computer animation and learning effectiveness descriptive based on quantitative and qualitative criteria ; (8) the product obtained to computer animated models of magnetic and electric learning effectiveness and learning outcomes (9) prepare research reports . And a study by developing models using computer animation and physics education for students learning the four semesters in the course of two magnetic power take six months.

Results And Discussion

Research . (1) obtained a model of learning computer animation magnetic electric two of : (a) Oerstet , (b) the Lorentz force , and (c) Lenz's law and Faraday . Details of assessment models pembelajran computer animation physics electricity magnetism two , consists of three components , namely : (1) the model can score 19.68, (2) computer -based animation with a score of 45 , 94 , (3) the principles of physics 17 , 94 and the total score was 82.76 .

Discussion . The results of the first assessment entrance test predicate is very less and the second test went very well predicate . Based on the results of the second test with an average score of 84.33 with an excellent title if embraced complete learning there is no remedial learning means learning process is very effective . This means that the study supported the theory , relevant research , and the development of research methodology learning computer animation model electric magnet models obtained good results and are very effective in student learning outcomes .

Conclusions and Recommendations

Conclusions . (a) the product obtained anaimasi model of computer learning courses Electricity Magnetism 2 Physical Education Program for students 4th semester with good predicate entry assessment results , and (b) the results obtained in the course learning Electric Magnet 2 on Physics Education Program students education students four semester using computer animation model makes a predicate very good or very effective .

Advice . (a) the product of the preparation of computer-animated models for learning in students of Physical Education four semester with a good rating assessment result entry , it is expected to do more improvements in terms of modeling and animation and more to be tested. And (b) the results of assessment of learning using computer animation model makes a predicate on a very good student so efetif . In order to be sustained achievements that have been obtained , then the model can be developed for the computer animation in the effective use of computers for learning .

References

Benny Suprapto dkk. (1986). Energi Gelombang dan Medan 3. Jakarta: Departemen Pendidikan dan kebudayaan Rpublik Indonesia.

Borg, W. R & Gall, M. (1983). Educational Rearch and Introduction. New York: Longman.

Ki B. Boentarsono dkk . (2012). Tamansiswa Badan Perjuangan Kebudayaan dan Pembangunan Masyarakat. Yogyakarta: Perguruan Tamansiswa.

Mayub, A. (1998). Perancangan dan Pembuatan Model Animasi gerak Dua Demensi dengan Macromedia Flash MX. Yoyakarta: Tesis S2 Ilkom UGM.

Mayub, A. (2005). E-Learning Fisika Berbasis Macromedia Flash MX. Yogyakarta.: Graha Ilmu.

Saifudin Anwar. (1996). Tes Prestasi Fungsi dan Pengembangan Pengukuran Prestai Belajar. Yogyakarta: Pustaka Pelajar.

Sears Francis Weston dan Zemansky Mark W. (1954), Fisika untuk Universitas II Listrik Magnit. Bandung: Dwiwantara.

Soegeng. (1993). Fisika Komputasi Jilid I. Bandung: Fisika ITB,

Sukardjo dan Lis Permana Sari. (2006). Penilaian Hasil Belajar Kimia, Jogyakarta: FMIPA UNY.

Suyoso (2011). Listrik Magnet. Yogyakarta. Yogyakarta: Jurusan Fisika Fakultas Pendidikan Matematika Ilmu Pengetahuan Alam UNY.

Wijaya, D. (2002). Macromedia Flash MX 5.0 dengan Action Script. Jakarta: PT Elex Media Komutindo.

Zeembry, (2001). Animasi Web dengan Macromedia Flash 5. Jakarta: PT Elex Media Komputindo,.

.....;(2011). Silabus Program Pendidikan Fisika. Yogyakarta: Fakultas Pendidikan dan Ilmu Keguruan Universitas Sarjanawiyata Tamansiswa.

.....; (1998). Jurnal Kependidikan, Yogyakarta: Lembaga Penelitian IKIP Yogyakarta ISSN No: 0125-9992X.